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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/543,284	04/05/2000	Boris Dmitrievich Lubachevsky	Lubachevsky-10-2	6481

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EXAMINER	
STEVENS, THOMAS H	

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 10/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/543,284	LUBACHEVSKY ET AL.	
	Examiner	Art Unit	
	Thomas H. Stevens	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-20 were examined.

Response to Arguments

35 USC § 112

2. Applicants are thanked for responding to this issue. The examiner is clear, and is well aware of the scientific meaning of the exponential and event(s) (i.e., probability). The problem stemmed from how notation was presented in the document. In some cases the exponential is italicized and bolded. Nonetheless, the rejection is withdrawn.

3. The rejection is withdrawn with regard to the phrase "one or more iterations". However, rejections for 7,8 and 14 stand because it is unclear as to who or what is "carried out".

4. With regard to claim 13, the examiner was unclear as to what the phrase "accounting is based on present knowledge of stats" means. However, on page 8 of the applicants response clarifies it to a certain degree; but the response boarders on conceptual or theoretical ideas (i.e., "...the concept that states of the events might be different from those believed to be..." pg. 8, line 1), this admitting that the results inconclusive. Rejection is withdrawn.

Claim Rejections - 35 USC § 101

5. Applicants are thanked for responding to this issue. Based on what was admitted by applicant (i.e., comment number 4 in the 112 second response to arguments section) the rejection stands because the application is clearly is an abstract of mathematical events with no consistent concrete result or post-solution activity.

35 USC § 102

6. Applicants are thanked for responding to this issue; however, the rejection stands because applicant's arguments are not persuasive because the prior used in the rejection does teach aspects of the invention such that one can deduce the applicant extracted and messaged the prior art so the claims do not, match what the prior art teaches verbatim. For example, the prior by "Synchronous Relaxation for Parallel Simulations with Applications to Circuit-Switched Networks (1993) states that "e can be process only if its simulated time is the minimum of the simulated times of all the events currently scheduled (e.g. pg. 289, 1.1 Related Work section 1.1, line lines 4-8. For the applicant to say there's no mention of the exponential "e" associated with M/log M (pg. 289, 3rd paragraph) is not true. The preceding paragraphs on page 289 teach M/log M. Second, the applicant states no mention of the term (l—1) Δ, l Δ, which is stated on page 288, 6th paragraph). The applicants' state the prior art fails to mention M edge events, which are taught in the specification, which draws comparisons between the

energy of the atom and probability. The examiner counters this minute point with the finding of teaching found in the prior art on page 292, lines 13-15 stating "...the overflowing of calls are offered to a two-link path with minimal load class...defined by specific boundaries..." which is in light of the teaching of probability as stated. Furthermore, the examiner equates boundaries and edge based on this argument. Subsequently, the examiner referenced other works by the applicant's strictly for the prosecution.

Objection/Rejections

New Matter in the Specification

7. The amendment filed 7/2804 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material, (pg. 5, line 9) was not supported by the original disclosure. Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

9. Regarding claim 1, the phrase "physical system" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 101

10. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

11. Claims 1-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to an algorithm .The examiner respectfully submits that the applicants have not claimed a practical application. An invention which is eligible for patenting under 35 U.S.C. § 101 is in the "useful arts" when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. The fundamental test for patent eligibility is thus to determine whether the claimed invention produces a "useful, concrete and tangible result.

The examiner respectfully submits, under current PTO practice, that the claimed invention does not recite a tangible or concrete result. The claims are not tangible because they appear to recite a mathematical algorithm namely the discrete element parallel simulation is confined or limited space that doesn't have specific preprocessing or post solution activity.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Lubachevsky et al ("Synchronous Relaxation for Parallel Simulations with Applications to Circuit-Switched Networks" Paper: 1993). Lubachevsky et al. teaches a general model of synchronous relaxation for parallel simulations with applications to circuit-switched networks (abstract). (Note: Since new matter was added to the specification, the examiner did not address the material in that was injected into the claims since it was not supported in the original specification despite the scientific notation issues.)

Claim 1: A method executed in hardware simulating events comprising the steps of: assigning events in a physical system comprising the steps of: assigning events of said physical system that are to be simulated to each of the processing elements (PEs) (pg. 312, lines 1-7;and 289, lines 20-25); and said N PEs simulating events in parallel, in a simulation step where each processing element (PE) simulates assigned events in blocks of M edge events, where M is approximately a $\log_e N$, e is approximately 2.71828 and an edge event is an event whose simulation in a processing element is directly affected by information originating in another processing element (pg. 289, lines 1-8).

Claim 2: The method of claim 1 where each of said simulation steps comprises one or more iterations (pg 294, figures 2 and 3;pg. 295, lines 15-17).

Claim 3: The method of claim 2 where each iteration comprises a simulation phase followed by a communication phase (pg. 299, Gauss-Sidel section) and an assessment phase (pg. 299, computational experience, lines 4-7).

Claim 4: The method of claim 3 where, in each communication phase (pg. 299, Gauss-Sidel section), each of said PEs shares information with one or more other PEs from said N PEs, which information is needed by said other PEs to simulate edge events of said other PEs.

Claim 5: The method of claim 4 where said information shared by each PE in a communication phase of an iteration is related to events simulated by said each PE in said iteration (pg. 294, figures 2-3).

Claim 6: The method of claim 4 where said assessment phase carried out by each of said PEs comprises the steps of determining whether the existence of a simulation error can be excluded (pg. 302, data flow analysis section, lines 7-13) and directing that another simulation iteration is to take place when the existence of a simulation error cannot be excluded.

Claim 7: The method of claim 6 further comprising a floor advancement step, that is carried out when said step of determining, in said assessment phase concludes that there are no simulation errors (pg. 289, section1.1 Related Work, lines 1-8) iteration, where the advancement step advances a simulation floor time of a present simulation step to form a modified simulation time floor, for simulating another block of M events in a next simulation step (pg. 299, lines 9-15).

Claim 8: The method of claim 6 further comprising a step of advancing a simulation floor time from a simulation floor time of a present simulation step, to form a modified simulation floor time (pg. 299, lines 9-15), for starting from said modified simulation floor time the simulation of another block of M events in a next simulation step, when said step of determining in said assessment phase concludes that there are no simulation errors(pg. 289, section1.1 Related Work, lines 1-8) in said present simulation step.

Claim 9: The method of claim 8 where said modified simulation floor time corresponds (pg. 299, lines 9-15), to the earliest simulation time of the M^{th} edge event simulated by said N PEs in said present simulation step (pg. 289, lines 8-12).

Claim 10: The method of claim 4 where events are simulated seriatim in each simulation phase (pg. 289, lines 13-25).

Claim 11: The method of claim 10 where for simulating a second event following a simulation of a first event, a time interval (pg. 293, lines 7-8) is identified between a simulation time of said first event and a simulation time of said second event, and said second event is identified for simulation.

Claim 12: The method of claim 11 where said second event is identified for simulation following a step of accounting for simulation of said first event and simulation of events in said other PEs from said N PEs (pg. 295, second paragraph).

Claim 13: The method of claim 12 where said accounting is based on present knowledge of states of said other events (title, introduction).

Claim14: The method of claim 12 where said accounts for simulation of events in said other PEs from said N PEs accounts for events simulated during said time interval (figures 2 and 3).

Claim15: The method of claim 11 where said second event is identified by employing a first random number (pg.288, last two sentences).

Claim16: The method of claim 11 where said time interval is identified with a second random number (pg.288, last two sentences).

Claim 17: The method of claim 16 where said second random number is set to said first random number (pg.288, last two sentences).

Claim 18: The method of claim 15 where said first random number is derived from a random variable having a uniform distribution (pg. 309, lines 1-6).

Claim 19: The method of claim 15 where the seriatim simulation of each event in said block of M events, in a first iteration starting from a given simulation floor time, employs an independently derived random number from said random variable, forming thereby a sequence of random numbers (pg. 305-306, sections 6.0-6.1), and simulation of said block of M events in all subsequent iterations starting from said given simulation floor (pg. 299, lines 9-15) time employs said sequence of random numbers.

Claim 20: The method of claim 18 where the sequence of random numbers employed in one simulation step is different from a sequence of random numbers employed in another simulation step (pg. 305-306, sections 6.0-6.1),

Conclusion

14. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Stevens whose telephone number is (703) 305-0365, Monday-Friday (8:30 am- 5:30 pm) or contact Supervisor Mr. Kevin Teska at (703) 305-9704. The fax number for the group is 703-872-9306.

Any inquires of general nature or relating to the status of this application should be directed to the Group receptionist whose phone number is (703) 305-3900.

March 4, 2004

THS